

# HP StorageWorks

## 4000/6000/8000 Enterprise Virtual Array hardware configuration guide

Part number: 5697-5342  
Third edition: February 2006



**Legal and notice information**

© Copyright 2005-2006 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft®, MS-DOS®, MS Windows®, Windows®, Windows NT®, and Windows Server® are U.S. registered trademarks of Microsoft Corporation.

Java™ and Solaris™ are trademarks of Sun Microsystems, Inc.

Red Hat® and Red Hat® Enterprise Linux are registered trademarks of Red Hat, Inc.

Linux® is a registered trademark of Linus Torvalds.

4000/6000/8000 Enterprise Virtual Array hardware configuration guide

---

# Contents

About this guide	7
Overview	7
Intended audience	7
Related documentation	7
Conventions	7
Document conventions	7
Text symbols	8
Equipment symbols	8
Rack stability	9
HP technical support	9
HP-authorized reseller	9
Helpful web sites	10
Subscribing to proactive updates	10
HP product documentation survey	10
1 EVA 4000/6000/8000 hardware	11
Storage rack	11
36U rack	11
42U rack	11
Fibre Channel drive enclosures	11
Fibre Channel loop switches	12
EVA8000 HSV210 controllers	13
EVA6000 and EVA4000 HSV200 controllers	14
2 EVA8000 configurations	17
2C2D configuration	17
2C6D configuration	18
2C12D configuration	20
3 EVA6000 configurations	23
2C4D configuration	23
2C5D configuration	25
2C6D configuration	27
2C7D configuration	29
2C8D configuration	31
4 EVA4000 configurations	35
2C1D configuration	35
2C2D configuration	37
2C3D configuration	38
2C4D configuration	40
A Specifications	43
Physical specifications	43
Environmental specifications	43
Power specifications	44

B Low-voltage Japanese cabinets . . . . . 49

General description . . . . . 49

Reference documents . . . . . 49

Power configurations . . . . . 49

Specifications . . . . . 50

    EVA cabinet footprint . . . . . 50

    Weights and dimensions . . . . . 51

    Center of gravity . . . . . 51

    Tip stability . . . . . 52

Index . . . . . 53

---

# Figures

1 FC drive enclosure—front and rear views . . . . .	12
2 FC loop switch . . . . .	13
3 HSV210/200 controller—front view . . . . .	14
4 HSV210 controller—rear view . . . . .	14
5 HSV200 controller—rear view . . . . .	15
6 2C2D configuration . . . . .	17
7 EVA8000 2C2D cable diagram . . . . .	18
8 2C6D configuration . . . . .	19
9 EVA8000 2C6D cable diagram . . . . .	19
10 2C12D configuration . . . . .	21
11 EVA8000 2C12D cable diagram . . . . .	21
12 2C4D configuration . . . . .	23
13 EVA6000 2C4D cable diagram . . . . .	24
14 2C5D configuration . . . . .	25
15 EVA6000 2C5D cable diagram . . . . .	26
16 2C6D configuration . . . . .	27
17 EVA6000 2C6D cable diagram . . . . .	28
18 2C7D configuration . . . . .	29
19 EVA6000 2C7D cable diagram . . . . .	30
20 2C8D configuration . . . . .	31
21 EVA6000 2C8D cable diagram . . . . .	32
22 2C1D configuration . . . . .	35
23 EVA4000 2C1D cable diagram . . . . .	36
24 2C2D configuration . . . . .	37
25 EVA4000 2C2D cable diagram . . . . .	37
26 2C3D configuration . . . . .	39
27 EVA4000 2C3D cable diagram . . . . .	39
28 2C4D configuration . . . . .	40
29 EVA4000 2C4D cable diagram . . . . .	41
30 HP StorageWorks 42U low-voltage cabinet . . . . .	50
31 HP StorageWorks 36U low-voltage cabinet . . . . .	50
32 EVA cabinet footprint . . . . .	51

---

# Tables

1 Document conventions . . . . .	8
3 Maximum storage capacities for the 2C6D configuration . . . . .	20
4 Maximum storage capacities for the 2C12D configuration . . . . .	22
5 Maximum storage capacities for the 2C4D configuration . . . . .	25
6 Maximum storage capacities for the 2C5D configuration . . . . .	27
7 Maximum storage capacities for the 2C6D configuration . . . . .	29
8 Maximum storage capacities for the 2C7D configuration . . . . .	31
9 Maximum storage capacities for the 2C8D configuration . . . . .	33
10 Maximum storage capacities for the 4000 2C1D configuration . . . . .	36
11 Maximum storage capacities for the 2C2D configuration . . . . .	38
12 Maximum storage capacities for the 2C3D configuration . . . . .	40
13 Maximum storage capacities for the 2C4D configuration . . . . .	41
14 Enterprise Virtual Array 4000/6000/8000 Product Dimensions, Weight and Clearance . . .	43
15 Environmental specifications . . . . .	44
16 Enterprise storage system AC input line voltages . . . . .	44
17 Power Data (North America/Europe/Japan) maximum configuration . . . . .	45
18 EVA4000 power specifications — 208 Volts . . . . .	45
19 EVA4000 power specifications — 230 Volts . . . . .	45
20 EVA6000 power specifications — 208 Volts . . . . .	46
21 EVA6000 power specifications — 230 Volts . . . . .	46
22 EVA8000 power specifications — 208 Volts . . . . .	47
23 EVA8000 power specifications — 230 Volts . . . . .	47
24 HP StorageWorks 42U low-voltage cabinet . . . . .	51
25 HP StorageWorks 36U low-voltage cabinet . . . . .	51
26 Center of gravity measurements — 42U low-voltage cabinet . . . . .	52
27 Center of gravity measurements — 36U low-voltage cabinet . . . . .	52

---

# About this guide

This hardware configuration guide provides information to help you:

- Learn about the Enterprise Virtual Array hardware components.
- Understand the supported storage rack configurations.
- Understand the supported copper cable configurations.

Topics to be covered in this section include:

- [Overview](#)
- [Conventions](#)
- [Rack stability](#)
- ???

## Overview

This section covers the following topics:

- [Intended audience](#)
- [Related documentation](#)

## Intended audience

This book is intended for use by Enterprise Virtual Array customers involved in the installation, operation, and management of the EVA8000, EVA6000, and EVA4000 storage systems and who are experienced with the following:

- SANs and storage systems.
- Networking and virtual storage concepts.
- Enterprise Virtual Array products.

## Related documentation

Additional documentation is available from the HP web site at <http://welcome.hp.com/country/us/eng/prodserv/storage.html>.

## Conventions

Conventions consist of the following:

- [Document conventions](#)
- [Text symbols](#)
- [Equipment symbols](#)

## Document conventions

The document conventions included in [Table 1](#) apply in most cases.

**Table 1 Document conventions**

Element	Conventions
Cross-reference links	Blue text: Figure 1
Key and field names, menu items, buttons, and dialog box titles	<b>Bold</b>
File names, application names, and text emphasis	<i>Italics</i>
User input, command and directory names, and system responses (output and messages)	Monospace font <code>COMMAND NAMES</code> are uppercase monospace font unless they are case sensitive
Variables	<monospace, italic font>
Web site addresses	Blue, underlined sans serif font text: <a href="http://www.hp.com">http://www.hp.com</a>

## Text symbols

The following symbols may be found in the text of this guide. They have the following meanings:

### **WARNING!**



Text set off in this manner alerts you to a situation where the failure to follow directions could result in bodily harm or death.

### **CAUTION:**



Text set off in this manner alerts you to a situation where the failure to follow directions could result in damage to equipment or data.

### **NOTE:**



Text set off in this manner presents commentary, sidelights, or interesting points of information.

## Equipment symbols

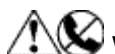
The following equipment symbols may be found on hardware discussed in this guide. They have the following meanings:



**WARNING:** Any enclosed surface or area of the equipment marked with this symbol indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.



**WARNING:** To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure. Any RJ-45 receptacle marked with these symbols indicates a network interface connection.



**WARNING:** To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle. Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.





**WARNING:** To reduce the risk of personal injury from a hot component, allow the surface to cool before touching. Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.



**WARNING:** To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems. Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.



**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

## Rack stability

### **WARNING!**

To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- In single rack installations, the stabilizing feet are attached to the rack.
- In multiple rack installations, the racks are coupled. Only one rack component is extended at any time. A rack may become unstable if more than one rack component is extended for any reason.

## HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site:  
<http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign up online using the Subscriber's choice web site:  
<http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

## HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-282-6672.

- Elsewhere, visit the HP web site: <http://www.hp.com>. Then click **Contact HP** to find locations and telephone numbers.

## Helpful web sites

For other product information, see the following HP web sites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- <http://www.hp.com/support/>
- <http://www.docs.hp.com>

## Subscribing to proactive updates

Receive support alerts (such as Customer Advisories), as well as updates on drivers, software, firmware, and customer replaceable components, proactively via email through HP Subscriber's Choice. Sign up for Subscriber's Choice at the following URL:

<http://www.hp.com/go/myadvisory>

## HP product documentation survey

Are you the person who installs, maintains, or uses this HP storage product? If so, we would like to know more about your experience using the product documentation. If not, please pass this notice to the person who is responsible for these activities.

Our goal is to provide you with documentation that makes our storage hardware and software products easy to install, operate, and maintain. Your feedback is invaluable in letting us know how we can improve your experience with HP documentation.

Please take 10 minutes to visit the following web site and complete our online survey. This will provide us with valuable information that we will use to improve your experience in the future.

<http://www.hpwebgen.com/questions.cfm?id=4601&pass=3712>

Thank you for your time and your investment in HP storage products.

---

# 1 EVA 4000/6000/8000 hardware

This chapter discusses the hardware components in the Enterprise Virtual Array. The following topics are discussed:

- Storage rack
- Fibre Channel Drive Enclosures
- Fibre Channel loop switches
- HSV210 controllers
- HSV200 controllers
- Copper cables

## Storage rack

Racks are available for the EVA storage system in 36U and 42U configurations. The storage rack can hold a maximum of 12 Fibre Channel drive enclosures (FC drive enclosures) and two controllers.

### 36U rack

The 36U rack is graphite in color and 1000 mm (39.4 inches) deep. The 19-inch (482.6 mm) industry-standard rack provides an enclosure for rack-mountable products with a height capacity of 36U. Perforated front and back doors are included, and 36U side panels and stabilizer kits are optional.

### 42U rack

The 42U rack is graphite in color and 909 mm (35.8 inches) deep. The storage rack features standard 19-inch (482.6 mm) mounting rails. The 42U rack can support Enterprise Virtual Array configurations that include FC loop switches or expansion panels. Perforated front and back doors are included, and 42U side panels and stabilizer kits are optional.

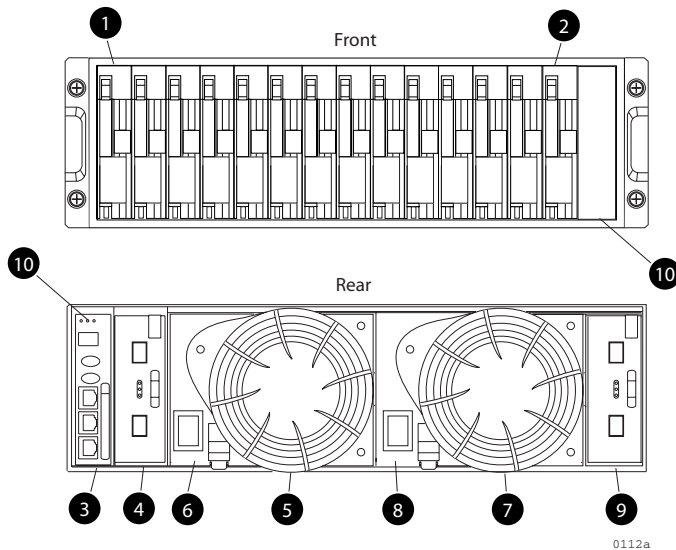
## Fibre Channel drive enclosures

Each FC drive enclosure includes the following features:

- 3U drive enclosure
- Dual redundant, active-to-active, 2-Gbps Fibre Channel loops
- Fourteen 1-inch Fibre Channel disks per enclosure
- Dual 2-Gbps Fibre Channel I/O module—A and B
  - Enhanced fault detection
  - SFPs
- Dual 500-W redundant hot-plug power supplies and fans

For ease of reference, the disk drives are usually referred to by their physical location, the drive bay number.

Figure 1 shows the front and rear views of the FC drive enclosure and the physical location of each drive bay.



**Figure 1 FC drive enclosure—front and rear views**

- |                 |   |
|-----------------|---|
| 1. Drive bay 1  | 2. Drive bay 14   |
| 3. EMU          | 4. I/O module B   |
| 5. Blower 1     | 6. Power supply 1   |
| 7. Blower 2     | 8. Power supply 2   |
| 9. I/O module A | 10. Status indicators (EMU, enclosure power, enclosure fault) |

## Fibre Channel loop switches

The Enterprise Virtual Array uses FC loop switches to connect all of the drive enclosures to the controller pair via copper cables. Each FC loop switch acts as a central point of interconnection and establishes a physical loop topology.

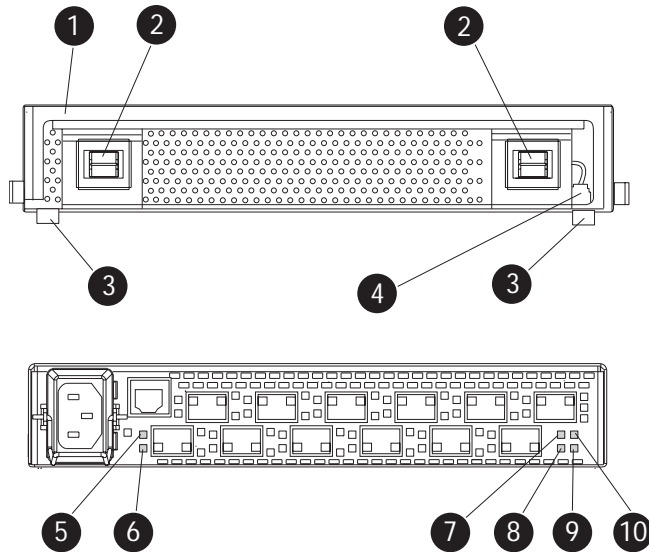
Switch use:

- EVA4000 does not use switches on any configuration
- EVA6000 uses switches on all configurations
- EVA8000 only uses switches with more than two disk enclosures

The major features of the FC loop switch are:

- 2.125-Gbps operating speed
- Twelve ports
- Half-width, 1U size
- System and port status indicators
- An ethernet port
- Universal power supply that operates between 100 to 250 VAC (or 50 to 60 Hz)
- Small Form-factor Pluggable (SFP) transceivers

Figure 2 shows the front and rear views of the Fibre Channel loop switch.



**Figure 2 FC loop switch**

- |                         |                                |
|-------------------------|--------------------------------|
| 1. Handle               | 2. Bezel snaps                 |
| 3. Alignment tabs       | 4. Walk-up RS232 port          |
| 5. SFP status indicator | 6. Port Bypassed indicator     |
| 7. POST fault indicator | 8. Over Temp indicator         |
| 9. Power indicator      | 10. Loop operational indicator |

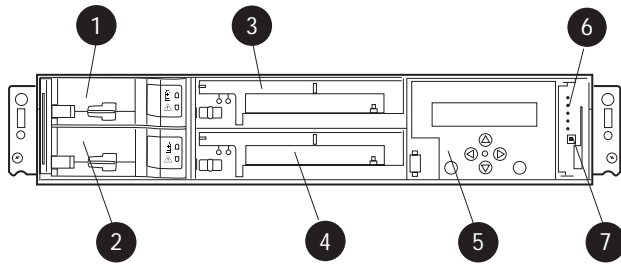
## EVA8000 HSV210 controllers

Two high-performance HSV210 controllers are contained in one EVA8000 rack. Each controller is contained in a separate enclosure and features:

- High-performance PowerPC microprocessor
- An Operator Control Panel (OCP) for easy operation
- 4U rack space required for both controller enclosures
- Four 2-Gbps Fibre Channel-Switched Fabric host ports
- Four 2-Gbps FC-AL device ports
  - Arranged in redundant pairs
  - Data load/performance is balanced across a pair
  - Supports up to 240 disks (120 disks per pair)
- 2-GB cache per controller, mirrored, with battery backup
- 2-Gbps FC cache mirroring port with device port backups
- Two mirror ports
- Dual power supplies

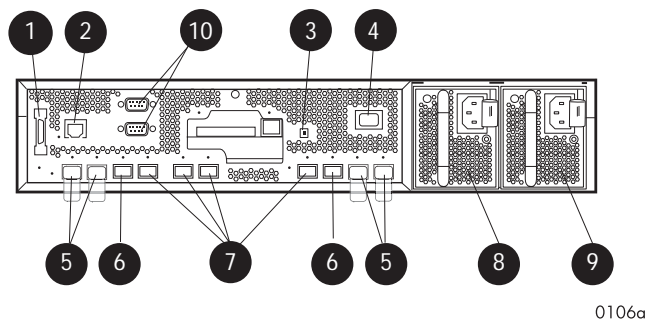
The controller is the interface between HP StorageWorks Command View EVA and the Enterprise Virtual Array (the interface between hosts and disks). Up to 18 drive enclosures are supported by one HSV210 controller pair (two controllers).

Figure 3 shows the front of the controller. Figure 4 shows the controller rear view.



**Figure 3 HSV210/200 controller—front view**

- |                                 |                             |
|---------------------------------|-----------------------------|
| 1. Battery 0                    | 2. Battery 1 (EVA8000 only) |
| 3. Blower 0                     | 4. Blower 1                 |
| 5. Operator Control Panel (OCP) | 6. Status indicators        |
| 7. Unit ID                      |                             |



0106a

**Figure 4 HSV210 controller—rear view**

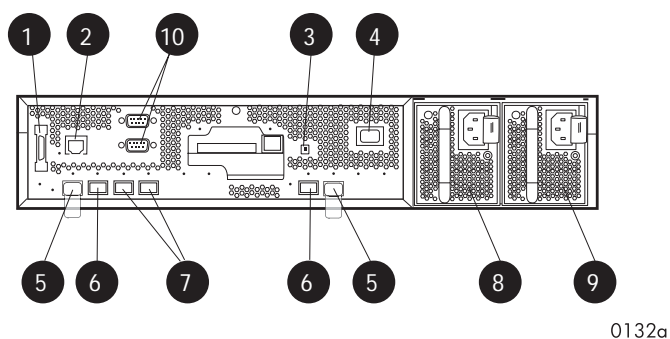
- |                                 |   |
|---------------------------------|---|
| 1. Dual controller interconnect | 2. CAB (cabinet address bus)                  |
| 3. Unit ID                      | 4. Power ON switch                            |
| 5. FC device ports              | 6. FC cache mirror ports                      |
| 7. FC host ports                | 8. Power supply 0                             |
| 9. Power supply 1               | 10. Service connectors (not for customer use) |

## EVA6000 and EVA4000 HSV200 controllers

Two high-performance HSV200 controllers are included in each EVA6000 and EVA4000 storage system. The EVA6000 and EVA4000 can be distinguished by their model numbers and the number of disk shelves. Each controller is installed in a separate enclosure and provides the following features:

- High-performance, PowerPC microprocessor
- An Operator Control Panel (OCP) for easy operation
- 4U rack space required for both controller enclosures
- Two 2-Gbps, FC-Switch Fabric host ports
- Two 2-Gbps, FC-AL device ports
  - Arranged as a single redundant pair
  - Data load/performance is balanced across a pair
  - Support for up to 112 drives
- 1-GB cache per controller, mirrored, with battery backup
- 2-Gbps, FC cache mirroring port with device port backups

Each HSV200 controller supports four drive enclosures on the EVA4000, and eight drive enclosures on the EVA6000. [Figure 3](#) shows the front of the controller. [Figure 5](#) shows the controller rear view.



0132a

**Figure 5 HSV200 controller—rear view**

- |                                 |   |
|---------------------------------|---|
| 1. Dual controller interconnect | 2. CAB (cabinet address bus)                  |
| 3. Unit ID                      | 4. Power ON switch                            |
| 5. FC device ports              | 6. FC cache mirror ports                      |
| 7. FC host ports                | 8. Power supply 0                             |
| 9. Power supply 1               | 10. Service connectors (not for customer use) |



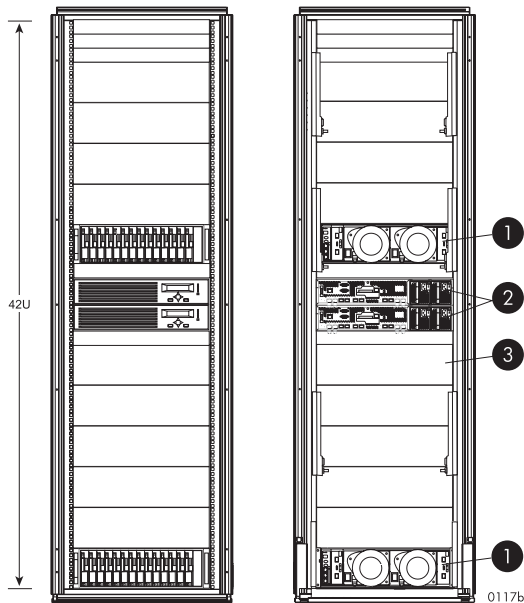


## 2 EVA8000 configurations

This chapter discusses the standard EVA8000 configuration. Each section describes the placement of HSV controllers, drive enclosures, enclosure address bus shelf ID expansion cables, and copper Fibre Channel cables.

### 2C2D configuration

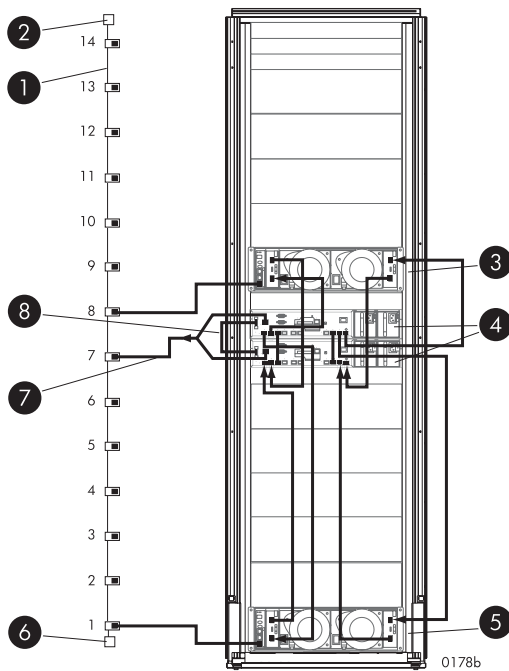
The 2C2D configuration provides a maximum storage capacity of 8.4 TB. This configuration can contain a maximum of 28 disks. This configuration is available in a 42U rack and has two HSV210 controllers and two drive enclosures.



**Figure 6 2C2D configuration**

1. Drive enclosure
2. HSV210 controller pair
3. 3U blank

The 2C2D cable routing diagram is located in [Figure 7](#).



**Figure 7 EVA8000 2C2D cable diagram**

1. ID port 14
2. Top terminator
3. Shelf 2
4. HSV210 controllers
5. Shelf 1
6. Bottom terminator
7. Y cable
8. Dual controller interconnect cable

## 2C2D features

The following features are included in the 2C2D:

- One storage rack
- Two controllers
- Two 14-drive bay FC drive enclosures
- Seven 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two OU PDUs

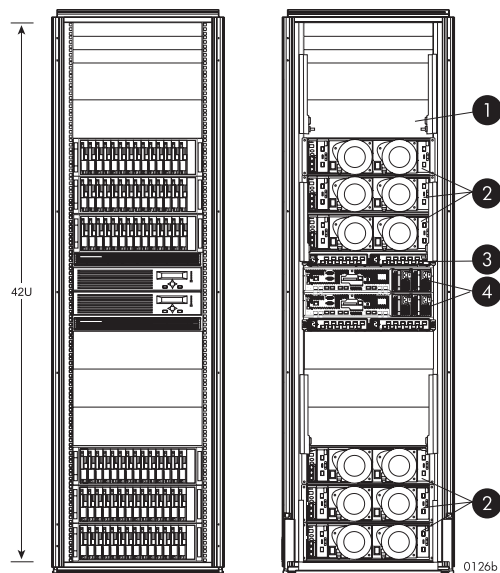


### NOTE:

Disks must be ordered separately.

## 2C6D configuration

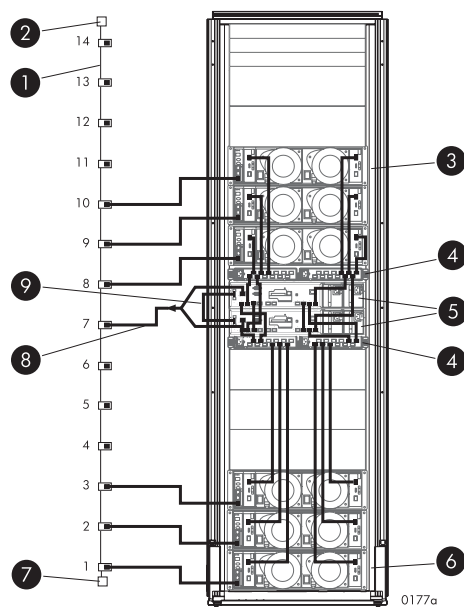
The 2C6D configuration provides a maximum storage capacity of 25.2 TB. This configuration can contain a maximum of 84 disks. This configuration is available in a 42U rack and has two loop switches, two HSV210 controllers, and six drive enclosures.



**Figure 8 2C6D configuration**

1. 3U blank
2. Drive enclosure
3. Switches
4. HSV210 controller pair

The 2C6D cable routing diagram is located in [Figure 9](#).



**Figure 9 EVA8000 2C6D cable diagram**

1. ID port 14
2. Top terminator
3. Shelf 10
4. FC switches
5. HSV210 controllers
6. Shelf 1
7. Bottom terminator
8. Y cable

## 9. Dual controller interconnect cable

### 2C6D features

The following features are included in the 2C6D:

- One storage rack
- Two controllers
- Six 14–drive bay FC drive enclosures
- Four FC loop switches
- Seven 2–port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



#### NOTE:

Disks must be ordered separately.

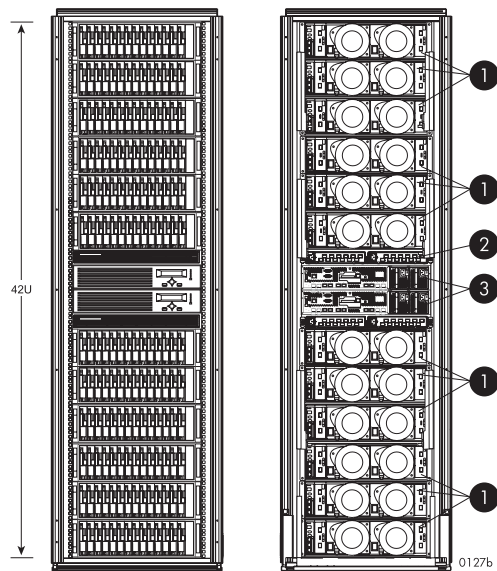
The 2C6D configuration can contain 84 disk drives and has a maximum storage capacity of 25.2 TB (Table 3).

**Table 3 Maximum storage capacities for the 2C6D configuration**

Disk size	Maximum capacity
72 GB	6.0 TB
146 GB	12.0 TB
250 GB	21.0 TB
300 GB	25.2 TB

### 2C12D configuration

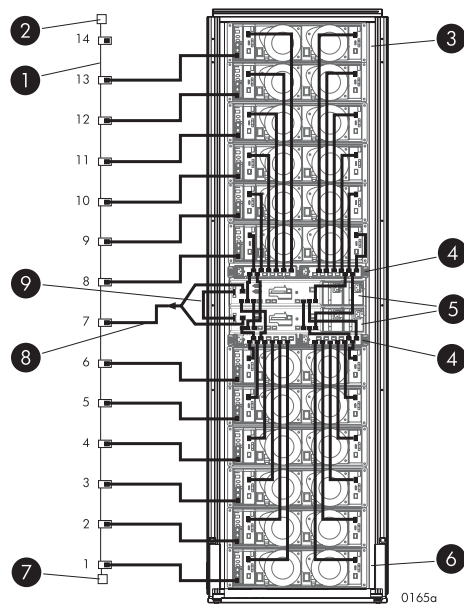
The 2C12D configuration provides a maximum storage capacity of 50.4 TB. This configuration can contain a maximum of 168 disks. This configuration is available in a 42U rack and has two HSV210 controllers, twelve drive enclosures, and four loop switches.



**Figure 10 2C12D configuration**

- 1. Drive enclosures
- 2. Switches
- 3. HSV210 controller pair

The 2C12D cable routing diagram is located in [Figure 11](#).



**Figure 11 EVA8000 2C12D cable diagram**

- 1. ID port 14
- 2. Top terminator
- 3. Shelf 13
- 4. FC switches
- 5. HSV210 controllers
- 6. Shelf 1
- 7. Bottom terminator
- 8. Y cable
- 9. Dual controller interconnect cable

## 2C12D features

The following features are included with the 2C12D configuration:

- One storage rack
- Two controllers
- 12 14–drive bay FC drive enclosures
- Four FC loop switches
- Seven 2–port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

Disks must be ordered separately.

---

**Table 4 Maximum storage capacities for the 2C12D configuration**

Disk size	Maximum capacity
72 GB	12.0 TB
146 GB	24.0 TB
250 GB	42.0 TB
300 GB	50.4 TB

# 3 EVA6000 configurations

This chapter discusses the standard EVA6000 configuration. Each section describes the placement of HSV controllers, drive enclosures, enclosure address bus shelf ID expansion cables, and copper Fibre Channel cables.

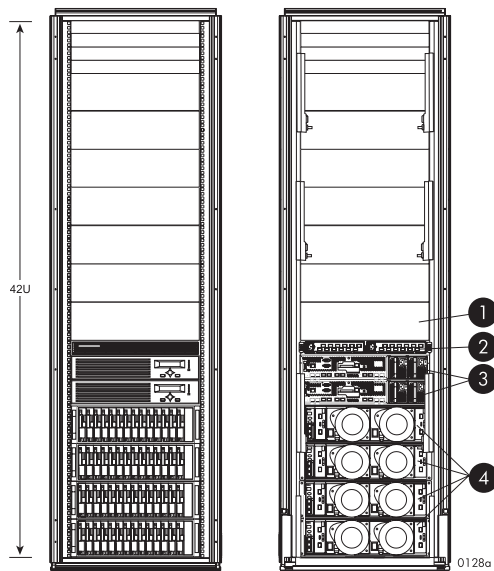


## NOTE:

A disk enclosure should not be connected to cabinet address bus 7 in any of the EVA6000 configurations.

## 2C4D configuration

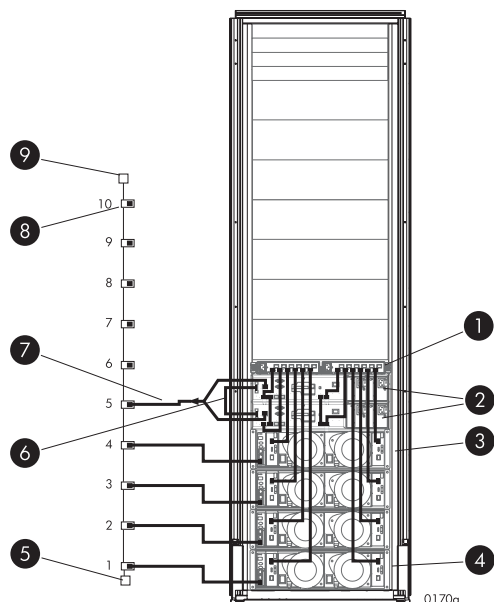
The 2C4D configuration provides a maximum storage capacity of 16.8 TB. This configuration can contain a maximum of 56 disks. This configuration is available in a 42U, 41U, 36U, 33U, 25U, or 22U rack and has two HSV200 controllers, four drive enclosures, and two loop switches.



**Figure 12 2C4D configuration**

1. 3U blank
2. Switch
3. Controller pair
4. Drive enclosure

The 2C4D cable routing diagram is located in [Figure 13](#).



**Figure 13 EVA6000 2C4D cable diagram**

1. FC switches
2. HSV200 controllers
3. Shelf 4
4. Shelf 1
5. Bottom terminator
6. Dual controller interconnect cable
7. Y cable
8. ID port 10
9. Top terminator

## 2C4D features

The following features are included with the 2C4D configuration:

- One storage rack
- Four 14-drive bay FC drive enclosures
- One pair of FC-AL loop switches
- One 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

Disks must be ordered separately.

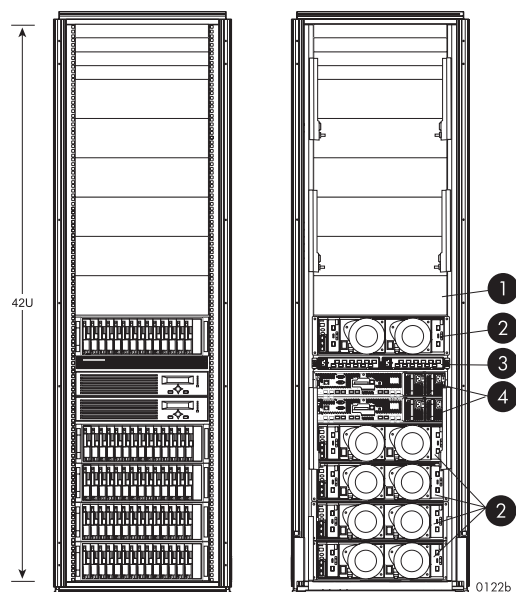


**Table 5 Maximum storage capacities for the 2C4D configuration**

Disk size	Maximum capacity
72 GB	4.0 TB
146 GB	8.1 TB
250 GB	14.0 TB
300 GB	16.8 TB

## 2C5D configuration

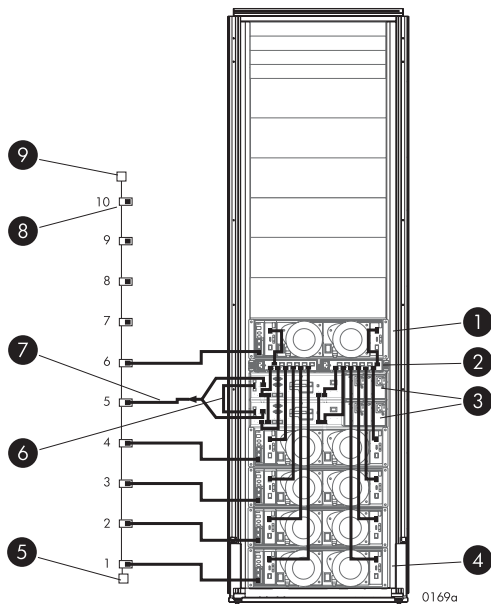
The 2C5D configuration provides a maximum storage capacity of 21.0 TB. This configuration can contain a maximum of 70 disks. This configuration is available in a 42U, 41U, 36U, 33U, 25U, or 22U rack and has two HSV200 controllers, five drive enclosures, and two loop switches.



**Figure 14 2C5D configuration**

1. 3U blank
2. Drive enclosures
3. Switch
4. Controller pair

The 2C5D cable routing diagram is located in [Figure 15](#).



**Figure 15 EVA6000 2C5D cable diagram**

1. Shelf 6
2. FC switches
3. HSV200 controllers
4. Shelf 1
5. Bottom terminator
6. Dual controller interconnect cable
7. Y cable
8. ID port 10
9. Top terminator

## 2C5D features

The following features are included with the 2C5D configuration:

- One storage rack
- Five 14-drive bay FC drive enclosures
- One pair of FC-AL loop switches
- One 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

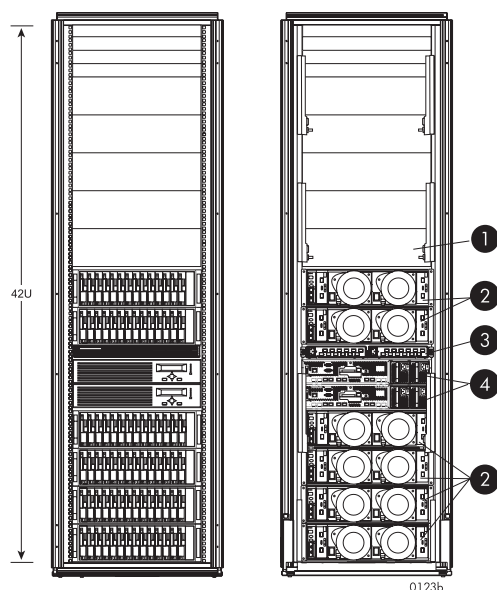
Disks must be ordered separately.

**Table 6 Maximum storage capacities for the 2C5D configuration**

Disk size	Maximum capacity
72 GB	5.0 TB
146 GB	10.0 TB
250 GB	17.5 TB
300 GB	21.0 TB

## 2C6D configuration

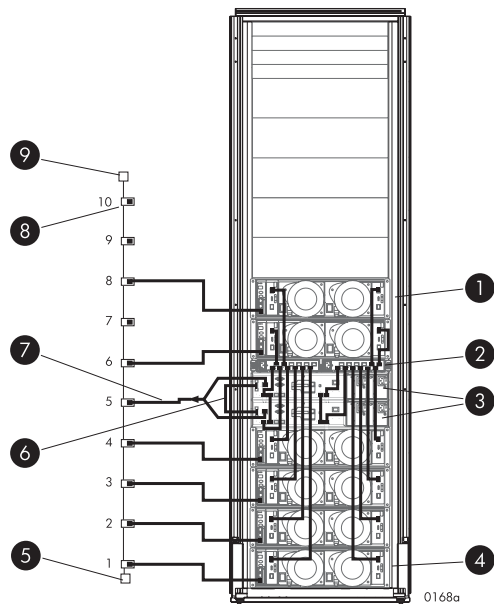
The 2C6D configuration provides a maximum storage capacity of 25.2 TB. This configuration can contain a maximum of 84 disks. This configuration is available in a 42U, 41U, 36U, 33U, or 25U rack, and has two HSV200 controllers, six drive enclosures, and four loop switches.



**Figure 16 2C6D configuration**

1. 3U blank
2. Drive enclosure
3. Switches
4. Controller pair

The 2C6D cable routing diagram is located in [Figure 17](#).



**Figure 17 EVA6000 2C6D cable diagram**

1. Shelf 6
2. FC switches
3. HSV200 controllers
4. Shelf 1
5. Bottom terminator
6. Dual controller interconnect cable
7. Y cable
8. ID port 10
9. Top terminator

## 2C6D features

The following features are included with the 2C6D configuration:

- One storage rack
- Six 14-drive bay FC drive enclosures
- One pair of FC-AL loop switches
- One 2-port enclosure address bus shelf ID expansion cable
- Six AC strips
- Two 0U PDUs



### NOTE:

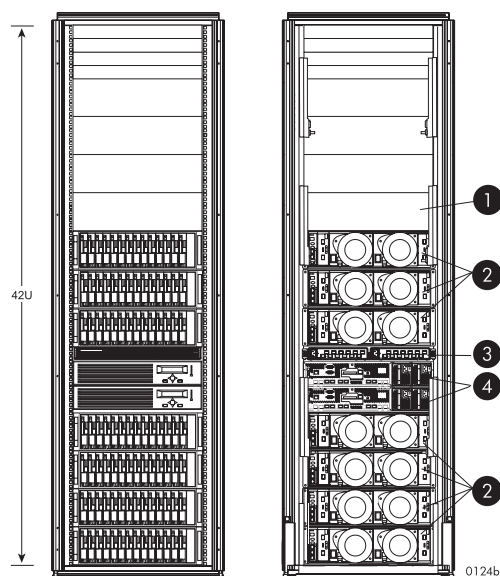
Disks must be ordered separately.

**Table 7 Maximum storage capacities for the 2C6D configuration**

Disk size	Maximum capacity
72 GB	6.0 TB
146 GB	1.0 TB
250 GB	21.0 TB
300 GB	25.2 TB

## 2C7D configuration

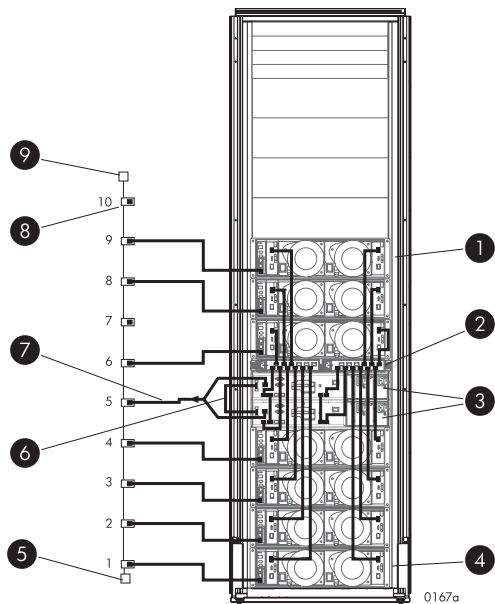
The 2C7D configuration provides a maximum storage capacity of 29.4 TB. This configuration can contain a maximum of 98 disks. This configuration is available in a 42U, 41U, 36U, or 33U rack and has two HSV200 controllers, seven drive enclosures, and two loop switches.



**Figure 18 2C7D configuration**

1. 3U blank
2. Drive enclosure
3. Switch
4. Controller pair

The 2C7D cable routing diagram is located in [Figure 19](#).



**Figure 19 EVA6000 2C7D cable diagram**

1. Shelf 7
2. FC switches
3. HSV200 controllers
4. Shelf 1
5. Bottom terminator
6. Dual controller interconnect cable
7. Y cable
8. ID port 10
9. Top terminator

## 2C7D features

The following features are included with the 2C7D configuration:

- One storage rack
- Seven 14-drive bay FC drive enclosures
- One pair of FC-AL loop switches
- One 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

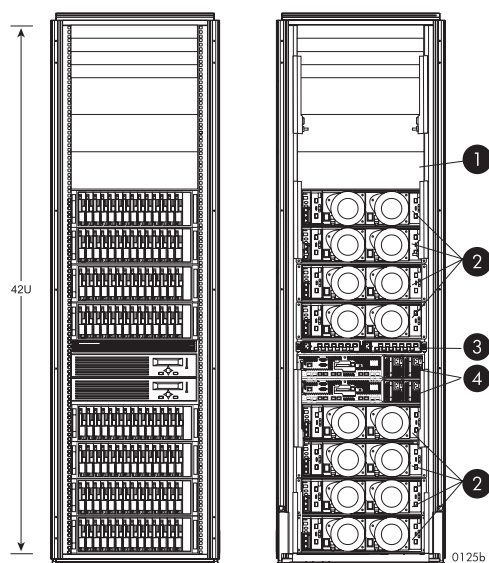
Disks must be ordered separately.

**Table 8 Maximum storage capacities for the 2C7D configuration**

Disk size	Maximum capacity
72 GB	7.0 TB
146 GB	14.0 TB
250 GB	24.5 TB
300 GB	29.4 TB

## 2C8D configuration

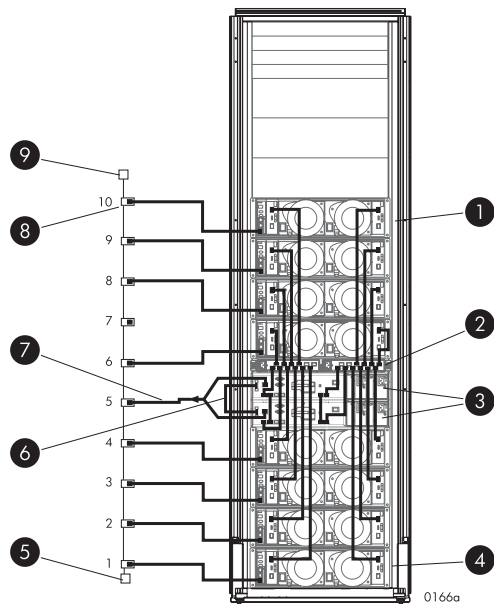
The 2C8D configuration provides a maximum storage capacity of 33.6 TB. This configuration can contain a maximum of 112 disks. This configuration is available in a 42U, 41U, 36U, or 33U rack and has two HSV200 controllers, eight drive enclosures, and two loop switches.



**Figure 20 2C8D configuration**

1. 3U blank
2. Drive enclosure
3. Switches
4. Controller pair

The 2C8D cable routing diagram is located in [Figure 21](#).



**Figure 21 EVA6000 2C8D cable diagram**

1. Shelf 8
2. FC switches
3. HSV200 controllers
4. Shelf 1
5. Bottom terminator
6. Dual controller interconnect cable
7. Y cable
8. ID port 9
9. Top terminator

## 2C8D features

The following features are included with the 2C8D configuration:

- One storage rack
- Eight 14-drive bay FC drive enclosures
- One pair of FC-AL loop switches
- One 2-port enclosure address bus cables
- Six AC strips
- Two 0U PDUs



### NOTE:

Disks must be ordered separately.



**Table 9 Maximum storage capacities for the 2C8D configuration**

Disk size	Maximum capacity
72 GB	8.0 TB
146 GB	16.0 TB
250 GB	28.0 TB
300 GB	33.6 TB

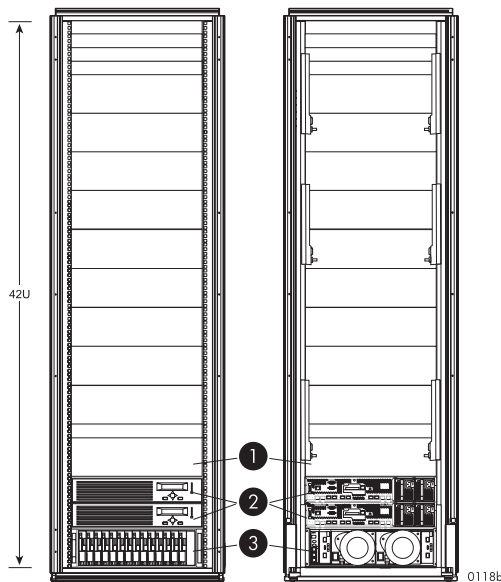


# 4 EVA4000 configurations

This chapter briefly discusses the standard EVA4000 configuration. Each section describes the placement of HSV controllers, drive enclosures, enclosure address bus shelf ID expansion cables, and copper Fibre Channel cables.

## 2C1D configuration

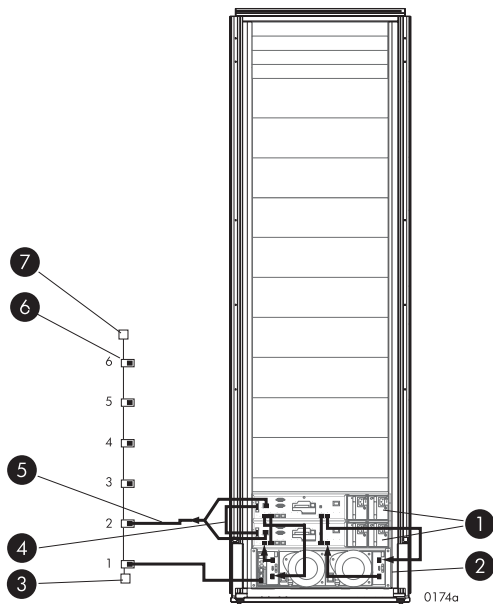
The 2C1D configuration provides a maximum storage capacity of 4.2 TB. This configuration can contain a maximum of 14 disks. This configuration is available in a 42U, 41U, 36U, 33U, 25U, or 22U rack and has two HSV200 controllers and one drive enclosure.



**Figure 22 2C1D configuration**

1. 3U blank
2. HSV200 controller pair
3. Drive enclosure

The 2C1D cable routing diagram is located in [Figure 23](#).



**Figure 23 EVA4000 2C1D cable diagram**

1. HSV200 controllers
2. Shelf 1
3. Bottom terminator
4. Dual controller interconnect cable
5. Y cable
6. ID port 6
7. Top terminator

## 2C1D features

The following features are included with the 2C1D configuration:

- One storage rack
- One 14–drive bay FC drive enclosures
- One 2–port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

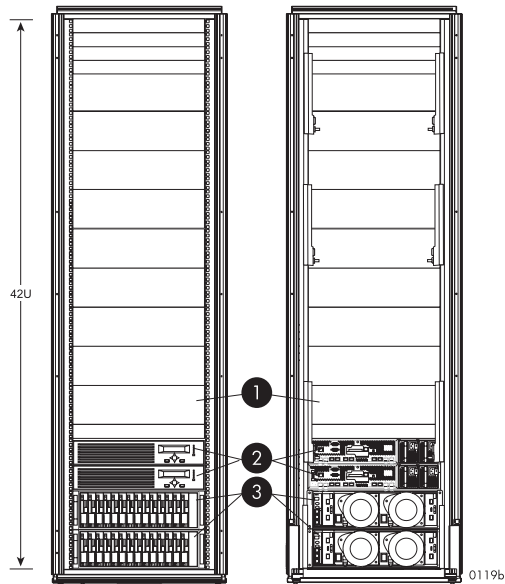
Disks must be ordered separately.

**Table 10 Maximum storage capacities for the 4000 2C1D configuration**

Disk size	Maximum capacity
72 GB	1 TB
146 GB	2 TB
250 GB	3.5 TB
300 GB	4.2 TB

## 2C2D configuration

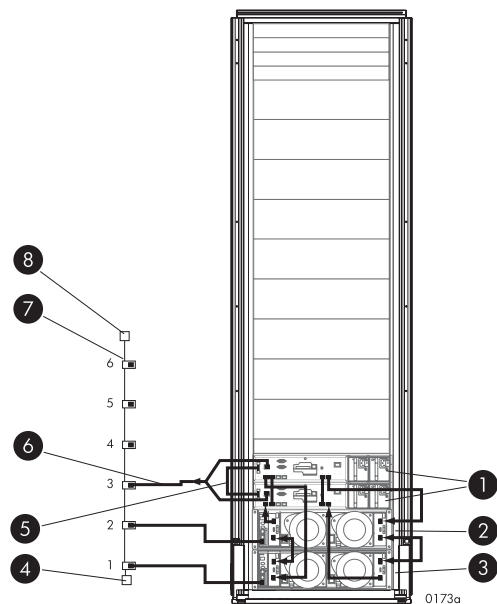
The 2C2D configuration provides a maximum storage capacity of 8.4 TB. This configuration can contain a maximum of 28 disks. This configuration is available in a 42U, 41U, 36U, 33U, 25U, or 22U rack and has two HSV200 controllers and two drive enclosures.



**Figure 24 2C2D configuration**

1. 3U blank
2. HSV200 controller pair
3. Drive enclosures

The 2C2D cable routing diagram is located in [Figure 25](#).



**Figure 25 EVA4000 2C2D cable diagram**

1. HSV200 controllers
2. Shelf 2
3. Shelf 1

4. Bottom terminator
5. Dual controller interconnect cable
6. Y cable
7. ID port 6
8. Top terminator

## 2C2D features

The following features are included with the 2C2D configuration:

- One storage rack
- Two 14-drive bay FC drive enclosures
- One 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



---

**NOTE:**

Disks must be ordered separately.

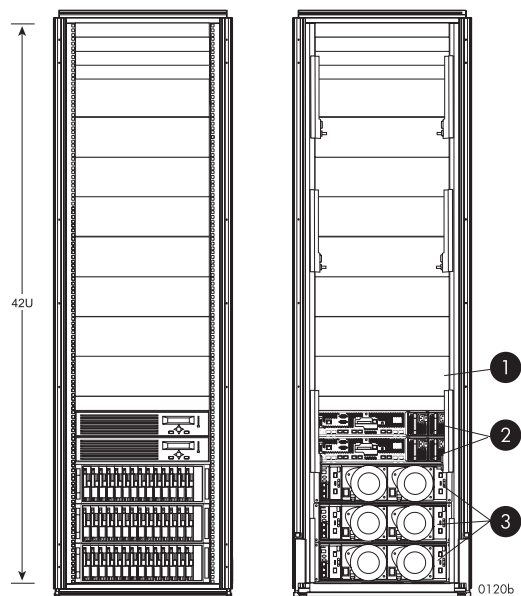
---

**Table 11 Maximum storage capacities for the 2C2D configuration**

Disk size	Maximum capacity
72 GB	2.0 TB
146 GB	4.0 TB
250 GB	7.0 TB
300 GB	8.4 TB

## 2C3D configuration

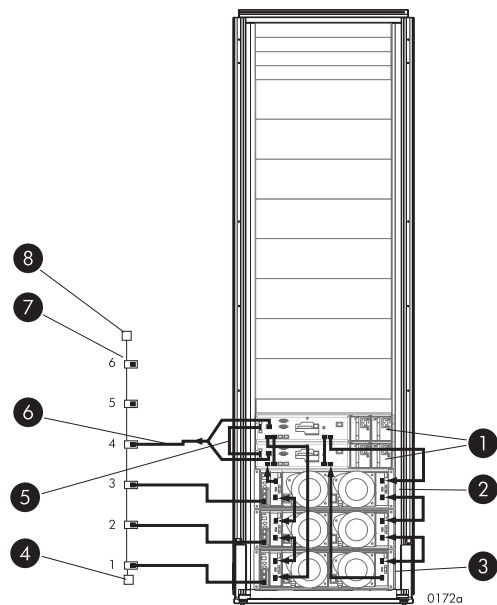
The 2C3D configuration provides a maximum storage capacity of 12.6 TB. This configuration can contain a maximum of 42 disks. This configuration is available in a 42U, 41U, 36U, 33U, 25U, or 22U rack and has two HSV200 controllers and three drive enclosures.



**Figure 26 2C3D configuration**

1. 3U blank
2. HSV200 controller pair
3. Drive enclosures

The 2C3D cable routing diagram is located in [Figure 27](#)



**Figure 27 EVA4000 2C3D cable diagram**

1. HSV200 controllers
2. Shelf 3
3. Shelf 1
4. Bottom terminator
5. Dual controller interconnect cable
6. Y cable
7. ID port 6
8. Top terminator

## 2C3D features

The following features are included with the 2C3D configuration:

- One storage rack
- Three 14-drive bay FC drive enclosures
- One 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

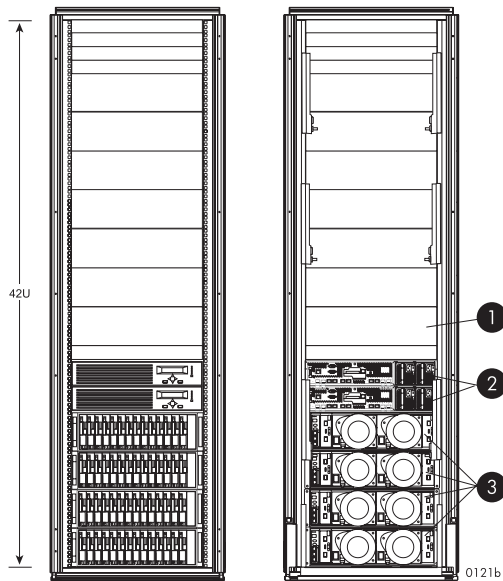
Disks must be ordered separately.

**Table 12 Maximum storage capacities for the 2C3D configuration**

Disk Size	Maximum Capacity
72 GB	3.0 TB
146 GB	6.1 TB
250 GB	10.5 TB
300 GB	12.6 TB

## 2C4D configuration

The 2C4D configuration provides a maximum storage capacity of 16.8 TB. This configuration can contain a maximum of 56 disks. This configuration is available in a 42U, 41U, 36U, 33U, 25U, or 22U rack and has two HSV200 controllers and four drive enclosures.

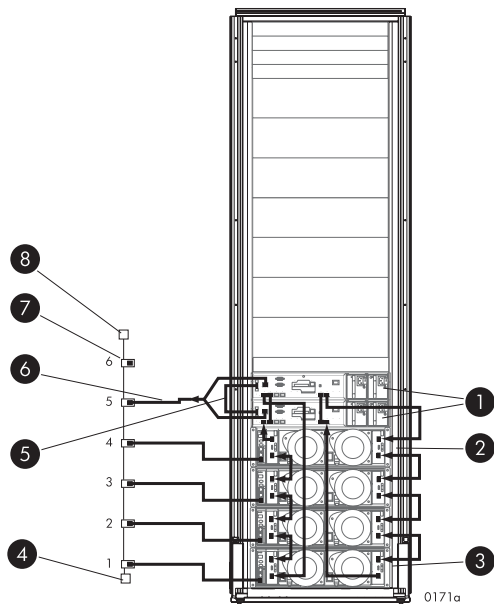


**Figure 28 2C4D configuration**

1. 3U blank
2. HSV200 controller pair
3. Drive enclosures

The 2C4D cable routing diagram is located in [Figure 29](#).





**Figure 29 EVA4000 2C4D cable diagram**

1. HSV200 controllers
2. Shelf 4
3. Shelf 1
4. Bottom terminator
5. Dual controller interconnect cable
6. Y cable
7. ID port 6
8. Top terminator

## 2C4D features

The following features are included with the 2C4D configuration:

- One storage rack
- Four drive bay FC drive enclosures
- One 2-port enclosure address bus shelf ID expansion cables
- Six AC strips
- Two 0U PDUs



### NOTE:

Disks must be ordered separately.

**Table 13 Maximum storage capacities for the 2C4D configuration**

Disk size	Maximum capacity
72 GB	4.0 TB
146 GB	8.0 TB
250 GB	14.0 TB
300 GB	16.8 TB



# A Specifications

This appendix defines the physical, environmental, and power specifications of the EVA 4000/6000/8000 storage systems.

The following topics are included:

- [Physical specifications](#)
- [Environmental specifications](#)
- [Power specifications](#)

## Physical specifications

This section describes the physical specifications of the drive enclosure and elements.

[Table 14](#) defines the dimensions and weights of the storage system components.

**Table 14 Enterprise Virtual Array 4000/6000/8000 Product Dimensions, Weight and Clearance**

Physical Dimensions	Height in/cm	Width in/cm	Depth in/cm	Max Weight lb/kg	Req. Front Clearance in/cm	Req. Rear Clearance in/cm
EVA4000/8000 2C2D (42U rack)	78.75 (200.03)	23.7 (60.3)	40.2 (102.2)	537 (244.1)	30 (76.2)	30 (76.2)
EVA6000/8000 2C6D (42U rack)	78.75 (200.03)	23.7 (60.3)	40.2 (102.2)	854 (308.2)	30 (76.2)	30 (76.2)
EVA8000 2C12D (42U rack)	78.75 (200.03)	23.7 (60.3)	40.2 (102.2)	1290 (586.4)	30 (76.2)	30 (76.2)
EVA4000/6000/8000 Controller Assembly	7.0/17.78	17.6/44.70	27.5/69.85	120/54.55	N/A	N/A
M5314B Drive Enclosure	5.25/13.34	19.0/42.26	20/50.8	71/32.21	N/A	N/A

## Environmental specifications

To ensure optimum product operation, you must maintain the operational environmental specifications listed in [Table 15](#). The ambient temperature (the enclosure air intake or room temperature) is especially critical.

**Table 15 Environmental specifications**

Operating Temperature	50° to 95° F (10° to 35° C) - Reduce rating by 1° F for each 1000 ft altitude (1.8° C/1,000 m)
Shipping Temperature	-40° to 150° F (-40° to 66° C)
Humidity	10% to 90% non-condensing
Shipping Humidity	5% to 90% non-condensing
Altitude	Up to 8,000 ft (2,400 m)
Air Quality	Not to exceed 500,000 particles per cubic foot of air at a size of 0.5 micron or larger

## Power specifications

The input voltage is a function of the country-specific input voltage to Enterprise storage system rack power distribution units (PDUs). [Enterprise storage system AC input line voltages](#) defines the AC input power available to the drive enclosure power supplies.

### △ CAUTION:

The AC power distribution within a rack ensures a balanced to each PDA and reduces the possibility of an overload condition. Changing the cabling to or from a PDM could cause an overload condition.

**Table 16 Enterprise storage system AC input line voltages**

Specification	Minimal	Nominal	Maximum
	<b>60 Hz service</b>		
AC Line Voltage	57 Hz	60 Hz	63 Hz
AC Line Voltage—Japan	180 VAC	202 VAC	220 VAC
AC Line Voltage—North America	180 VAC	208 VAC	220 VAC
AC Line Voltage—Europe	208 VAC	240 VAC	254 VAC
	<b>50 Hz service</b>		
AC Line Frequency	47 Hz	50 Hz	53 Hz
AC Line Voltage—Japan	180 VAC	202 VAC	220 VAC
AC Line Voltage—North America	190 VAC	220 VAC	235 VAC
AC Line Voltage—North America	200 VAC	230 VAC	244 VAC
AC Line Voltage—Europe	208 VAC	240 VAC	254 VAC

**Table 17 Power Data (North America/Europe/Japan) maximum configuration**

AC plug type (quantity 2)	North America – 3 wire NEMA No. L6-30R, 30 amp (208 to 240V 60Hz 30A) Europe – 3 wire, 2 pole IEC 309, 30 amp, (220 to 240V 50Hz 32A)
Number of phases	Single
Rated current	17A @ 200V-240V AC, 60Hz total, 4.25 A per power cord
Nominal Line Voltage	North America – 208 or 230V Europe – 230V Japan – 206V
Range Line Voltage	187 to 256V
Line Frequency	North America 60Hz, Europe 50Hz, Japan 50 or 60 Hz

**Table 18 EVA4000 power specifications — 208 Volts**

Specification		2C1D	2C2D	2C3D	2C4D
Typical <sup>1</sup>	Total System Wattage	507	883	1260	1637
	Total System BTU/hour	1729	3014	4300	5585
	Input Current (A) - Typical per system	2.5	4.4	6.3	8.2
	In Rush Current (A)	98	132	170	220
Failover Mode	Input Current (A) - Maximum per system	2.0	3.3	4.6	5.9

<sup>1</sup> Typical is described as a system in normal steady state operation. (I.e., both PDUs operating normally, the array reading/writing to disk drives in a production environment)

This data represents fully populated drive enclosures with 10K rpm disk drives. Other drive types may vary slightly.

**Table 19 EVA4000 power specifications — 230 Volts**

Specification		2C1D	2C2D	2C3D	2C4D
Typical <sup>1</sup>	Total System Wattage	507	883	1260	1637
	Total System BTU/hour	1729	3014	4300	5585
	Input Current (A) - Typical per system	2.3	4.0	5.7	7.4
	In Rush Current (A)	104	147	190	244
Failover Mode	Input Current (A) - Maximum per system	1.9	3.1	4.3	5.4

<sup>1</sup> Typical is described as a system in normal steady state operation. (I.e., both PDUs operating normally, the array reading/writing to disk drives in a production environment)

This data represents fully populated drive enclosures with 10K rpm disk drives. Other drive types may vary slightly.

**Table 20 EVA6000 power specifications — 208 Volts**

Specification		2C4D	2C5D	2C6D	2C7D	2C8D
Typical <sup>1</sup>	Total System Wattage	1707	2084	2460	2837	3214
	Total System BTU/hour	5824	7109	8395	9680	10965
	Input Current (A) - Typical per system	8.5	10.4	12.3	14.1	16.0
	In Rush Current (A)	220	250	280	321	363
Failover Mode	Input Current (A) - Maximum per system	5.9	7.1	8.3	9.5	10.8

<sup>1</sup> Typical is described as a system in normal steady state operation. (I.e., both PDUs operating normally, the array reading/writing to disk drives in a production environment)

This data represents fully populated drive enclosures with 10K rpm disk drives. Other drive types may vary slightly.

**Table 21 EVA6000 power specifications — 230 Volts**

Specification		2C4D	2C5D	2C6D	2C7D	2C8D
Typical <sup>1</sup>	Total System Wattage	1707	2084	2460	2837	3214
	Total System BTU/hour	5824	7109	8395	9680	10965
	Input Current (A) - Typical per system	7.7	9.4	11.1	12.8	14.5
	In Rush Current (A)	244	272	311	357	403
Failover Mode	Input Current (A) - Maximum per system	5.4	6.5	7.5	8.5	9.5

<sup>1</sup> Typical is described as a system in normal steady state operation. (I.e., both PDUs operating normally, the array reading/writing to disk drives in a production environment)

This data represents fully populated drive enclosures with 10K rpm disk drives. Other drive types may vary slightly.

**Table 22 EVA8000 power specifications — 208 Volts**

Specification		2C2D	2C6D	2C8D	2C10D	2C12D
Typical <sup>1</sup>	Total System Wattage	1023	2530	3284	4037	4920
	Total System BTU/hour	3492	8633	11204	13775	16789
	Input Current (A) - Typical per system	5.1	12.6	16.4	20.1	24.5
	In Rush Current (A)	132	280	363	451	528
Failover Mode	Input Current (A) - Maximum per system	3.3	8.3	10.8	13.1	15.5

<sup>1</sup> Typical is described as a system in normal steady state operation. (I.e., both PDUs operating normally, the array reading/writing to disk drives in a production environment)

This data represents fully populated drive enclosures with 10K rpm disk drives. Other drive types may vary slightly.

**Table 23 EVA8000 power specifications — 230 Volts**

Specification		2C2D	2C6D	2C8D	2C10D	2C12D
Typical <sup>1</sup>	Total System Wattage	1023	2530	3284	4037	4920
	Total System BTU/hour	3492	8633	11204	13775	16789
	Input Current (A) - Typical per system	4.6	11.4	14.8	18.2	21.6
	In Rush Current (A)	147	311	403	500	586
Failover Mode	Input Current (A) - Maximum per system	3.1	7.5	9.5	12.1	14.0

<sup>1</sup> Typical is described as a system in normal steady state operation. (I.e., both PDUs operating normally, the array reading/writing to disk drives in a production environment)

This data represents fully populated drive enclosures with 10K rpm disk drives. Other drive types may vary slightly.





---

# B Low-voltage Japanese cabinets

## General description

This specification describes HP's requirements for low voltage EVA storage cabinets. These low voltage cabinets are configured with two redundant sets of PDU's in order to provide system required power. Each PDU set is limited to 2550 W at a minimum voltage of 108. Each PDU is limited to one power strip to limit the number of EVA component attachment to eight components per power PDU. Power strip additions will likely overload the PDU systems.

## Reference documents

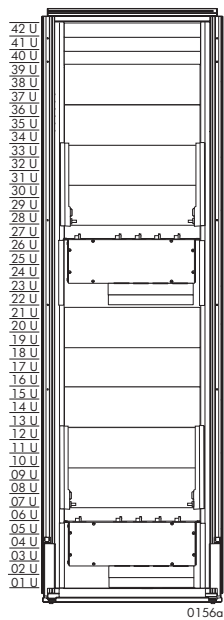
Reference documents are for informational purposes only. No requirement is implied by the inclusion or exclusion of reference documents.

- ANSI/EIA-310-D-1992, Cabinets, Racks, Panels and Associated Equipment
- EN60950:2000, Safety of Information Technology Equipment
- FCC Part 15 Code of Federal Regulations, Title 47, FCC Part 15 Radio Frequency Devices, Subpart B, Unintentional Radiators
- EN55022 (1998), Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
- EN55024 (1998), Information Technology Equipment – Immunity Characteristics and Methods of Measurement
- EN61000, Electromagnetic Compatibility
- CAN/CSA-C22.2 No. 60950-00/3rd Edition, Safety of Information Technology Equipment

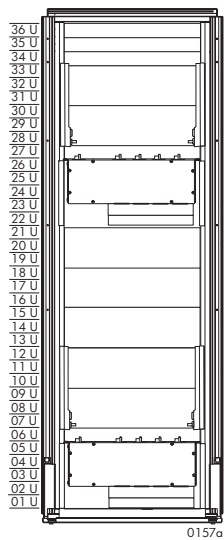
All brands, names, trademarks and logos are the property of their respective owners.

## Power configurations

There are two power configurations, the AD572A and the AD573A. The AD572A uses the HP StorageWorks 42U Low-voltage cabinet ([Figure 30](#)) and the AD573A uses the HP StorageWorks 36U Low-voltage cabinet ([Figure 31](#)).



**Figure 30 HP StorageWorks 42U low-voltage cabinet**



**Figure 31 HP StorageWorks 36U low-voltage cabinet**

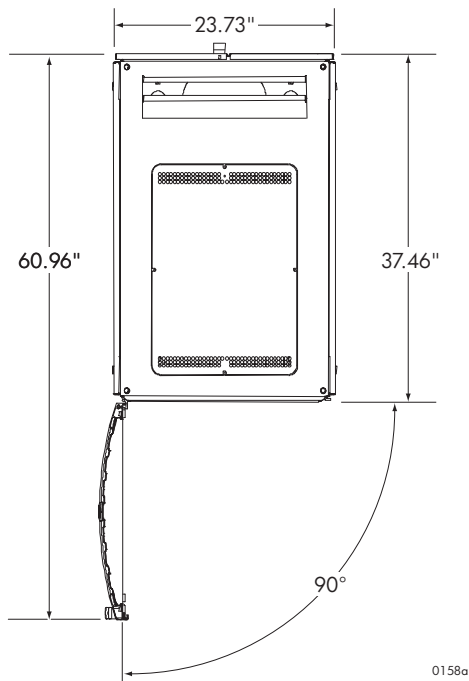
## Specifications

This section contains information on:

- EVA cabinet footprint
- Weights and dimensions of the low-voltage cabinets
- Center of gravity and stability
- Torque specifications
- Environmental specifications
- Electrical specifications

### EVA cabinet footprint

Figure 32 shows the dimensions of the EVA cabinet footprint.



**Figure 32 EVA cabinet footprint**

## Weights and dimensions

Table 24 shows the weights and dimensions for the 42U low-voltage cabinet. Table 25 shows the same information for the 36U low-voltage cabinet.

**Table 24 HP StorageWorks 42U low-voltage cabinet**

	Weight lbs	Height in	Width in	Depth in
Assembly	254	78.85	23.73	40.22
Packaged Assy	367	84.63	35.50	46.50

**Table 25 HP StorageWorks 36U low-voltage cabinet**

	Weight lbs	Height in	Width in	Depth in
Assembly	Not Avail2-16-05	68.35	23.73	40.22
Packaged Assy	Not Avail2-16-05	68.76	35.50	46.50

## Center of gravity

Table 26 shows the center of gravity measurements for the 42U low-voltage cabinet. Table 27 shows the same information for the 36U low-voltage cabinet.

The center of gravity of the assemblies is measured from the front mounting face of the vertical mounting rails, the top inside surface of the cabinet base, and the center of the cabinet ( $\pm 1.5$  inches).

**Table 26 Center of gravity measurements — 42U low-voltage cabinet**

Measurement	Inches
Depth from mounting face of vertical mounting rails	16.56
Height from inside base	37.09
Distance from cabinet center (viewing front of cabinet)	0.46 (left of center line)

**Table 27 Center of gravity measurements — 36U low-voltage cabinet**

Measurement	Inches
Depth from mounting face of vertical mounting rails	Not Avail2-16-05
Height from inside base	Not Avail2-16-05
Distance from cabinet center (viewing front of cabinet)	Not Avail2-16-05

## Tip stability

The system must pass tip stability testing for a 10° tip test and 250N side-force tip test per CAN/CSA-C22.2 No. 60950-00/3rd Edition, Safety of Information Technology Equipment.

Results of tip and tilt calculations show that the testing of this configuration is not necessary. Center of gravity locations, within the 10° boundaries show no danger of tip. Force tip testing calculations indicate that the rear force tip test need not be performed.

---

# Index

## Symbols

0C12D configuration  
describing features, [24, 36, 38, 40, 41](#)  
2C12D configuration  
describing features, [18, 20](#)  
36U rack, [11](#)  
42U rack, [11](#)  
8C8D configuration  
describing features, [22](#)

## C

controller  
defined, [13](#)  
conventions  
document, [7](#)

## D

document  
conventions, [7](#)  
prerequisites, [7](#)

## E

enclosures, physical specifications, [43](#)  
environmental specifications  
drive enclosure, [43](#)  
expansion  
expansion rack, [24, 26, 28, 30, 32, 36, 38, 40, 41](#)  
expansion racks, [24, 26, 28, 30, 32, 36, 38, 40, 41](#)

## F

FC drive enclosures  
describing features, [11](#)  
FC loop switches  
describing features, [12](#)  
Fibre Channel drive enclosure, [11](#)

## H

HP  
Subscriber's choice web site, [9](#)

HSV Controllers  
defined, [13](#)

## L

loop topology, [12](#)

## O

opal rack, [11](#)

## P

physical specifications  
enclosures, [43](#)  
power specifications  
drive enclosure, [44](#)  
prerequisites, [7](#)

## R

rack stability, warning, [9](#)

## S

SFP, [12](#)  
specifications  
physical, [43](#)  
power, [44](#)  
storage racks, [11, 11](#)  
Subscriber's choice, HP, [9](#)  
system expansion, [24, 26, 28, 30, 32, 36, 38, 40, 41](#)

## T

topology, [12](#)  
transceivers, [12](#)

## W

warning  
rack stability, [9](#)  
web sites  
HP Subscriber's choice, [9](#)